Using Hurricane Models to Produce Insurance Rates in South Carolina

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Hurricane Model

 A hurricane model is a series of calculations designed to create several hundred thousand years of future hurricanes based on the best scientific knowledge we have regarding the meteorology, structural engineering and actuarial science from the most up to date information available.

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- Insurance is a necessary part of any economy.
- Insurers need to be able to charge rates that are commensurate with the risk.
- Hurricane models are the only accepted way to create hurricane insurance rates.
- The public needs assurance that the hurricane rates are appropriate

How Can we Review the Models?

- In order to review the hurricane model, we need experts in meteorology, structural engineering and actuarial science to:
- 1. determine that the calculations are performed in accordance with our current scientifically accepted knowledge, and
- 2. that there are no biases in the model

FCHLPM

 After Hurricane Andrew, the State of Florida created a way to review hurricane models that were going to be used to produce hurricane insurance rates in Florida.

FCHLPM

Commission

Insurance Consumer Advocate FHCF Executive Director Executive Director of Citizens P.I.C. Director of Emergency Management FHCF Advisory Council Actuary Florida OIR Actuary P & C Company Actuary Professor of Insurance Finance Professor of Statistics Professor of Computer Science Professor of Meteorology

Accurate

 Designed and constructed in a careful, sensible, and scientifically acceptable manner such that they correctly describe the critical aspects needed to project loss costs

Reliable

 Consistently produce dependable results and that there is no inherent or known bias which would cause the model or technique to overstate or understate the results

Professional Team

- Meteorologist Dr. Jenni Evans
- Structural Engineer Dr. Masoud Zadeh
- Actuary Martin Simons
- Statistician Dr. Mark Johnson
- Computer Scientist Dr. Paul Fishwick

Standards

- General (5 standards)
- Meteorology (6 standards)
- Vulnerability (3 standards)
- Actuarial (6 standards)
- Statistical (6 standards)
- Computer (7 standards)

Forms

- General 7 Forms –(expert certification)
- Meteorological 3 Forms
- Vulnerability 3 Forms
- Actuarial 8 Forms
- Statistical 6 Forms

Standards

- To be determined acceptable, the model must have been found acceptable for all Standards.
- If the model fails to be found acceptable, by a majority vote, for any one Standard, the model will not be found to be acceptable.

G-4 Independence of Model Components

• The meteorological, vulnerability, and actuarial components of the model shall each be theoretically sound without compensation for potential bias from the other two components.

M-3 Hurricane Probabilities

• B. Modeled hurricane landfall frequency distributions shall reflect the Base Hurricane Storm Set used for category 1 to 5 hurricanes and shall be consistent with those observed for each coastal segment of Florida and neighboring states (Alabama, Georgia, and Mississippi).

V-1 Derivation of Vulnerability Functions

 A. Development of the vulnerability functions shall be based on any or a combination of the following: (1) historical data, (2) tests, (3) structural calculations, (4) expert opinion, or (5) site inspections. However, any development of the vulnerability functions based on structural calculations or expert opinion shall be supported by tests, site inspections, and historical data.

A-1 Modeling Input Data

 A. When used in the modeling process or for verification purposes, adjustments, edits, inclusions, or deletions to insurance company input data used by the modeling organization shall be based upon accepted actuarial, underwriting, and statistical procedures.

A-1 Modeling Input Data

• B. All modifications, adjustments, assumptions, inputs and/or input file identification, and defaults necessary to use the model shall be actuarially sound and shall be included with the model output report. Treatment of missing values for user inputs required to run the model shall be actuarially sound and described with the model output report.

What about South Carolina?

 The South Carolina Insurance Department has initiated a process to review hurricane models specifically for use in producing South Carolina Hurricane Insurance Rates.

Team of Experts

- Meteorologist Dr. Jenni Evans
- Structural Engineer Dr. Masoud Zadeh
- Actuary Martin Simons

Other Useful References

www.mmsimons.com

- Inside the Black Box, Best's Review, 8/02
- Maryland Insurance Department Hurricane Report Aug, 2011
- 2009-10 Professional Team Reports AIR, RMS, ARA, EQE, FPM
- Report to Hawaii Legislature Wind Resistive Grant Program 2001

Information from the FCHLPM <u>www.sbafla.com/methodology/</u>